



Are annual layers preserved in NorthGRIP Eemian ice?

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A newly developed setup for continuous flow analysis (CFA) of ice cores in Copenhagen is optimized for high resolution analysis of four components: Soluble sodium (mainly deriving from sea salt), soluble ammonium (related to biological processes and biomass burning events), insoluble dust particles (basically transported from Asian deserts to Greenland), and the electrolytic melt water conductivity (which is a bulk signal for all ionic constituents). Furthermore, we are for the first time implementing a flow cytometer to obtain high quality dust concentration and size distribution profiles based on individual dust particle measurements. Preliminary measurements show that the setup is able to resolve annual layers of 1 cm thickness. Ice flow models predict that annual layers in the Eemian section of the Greenland NorthGRIP ice core (130-115 ka BP) have a thickness of around 1 cm. However, the visual stratigraphy of the ice core indicates that the annual layering in the Eemian section may be disturbed by micro folds and rapid crystal growth. In this case study we will measure the impurity content of an Eemian segment of the NorthGRIP ice core with the new CFA setup. This will allow for a comparison to well-known impurity levels of the Holocene in both Greenland and Antarctic ice and we will attempt to determine if annual layers are still present in the ice.